Product Catalogue

2

CABLE CONNECTION TECHNIQUE

Ring Connectors

ARCUS ELEKTROTECHNIK
ALOIS SCHIFFMANN GMBH

Availability by phone:

For queries concerning products and delivery time, and to place an order by phone, we are available as follows:

+49 89 43604-0

Monday - Thursday:

8:00 a.m.-12:00 noon and 00:30 p.m.-04:00 p.m.

Friday:

8:00 a.m.-12:00 noon

Information concerning this catalogue:

 All dimensions and pictures are not binding. We permanently strive to improve products and reserve the right to change design, dimensions or material.

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Why Ring Connectors…

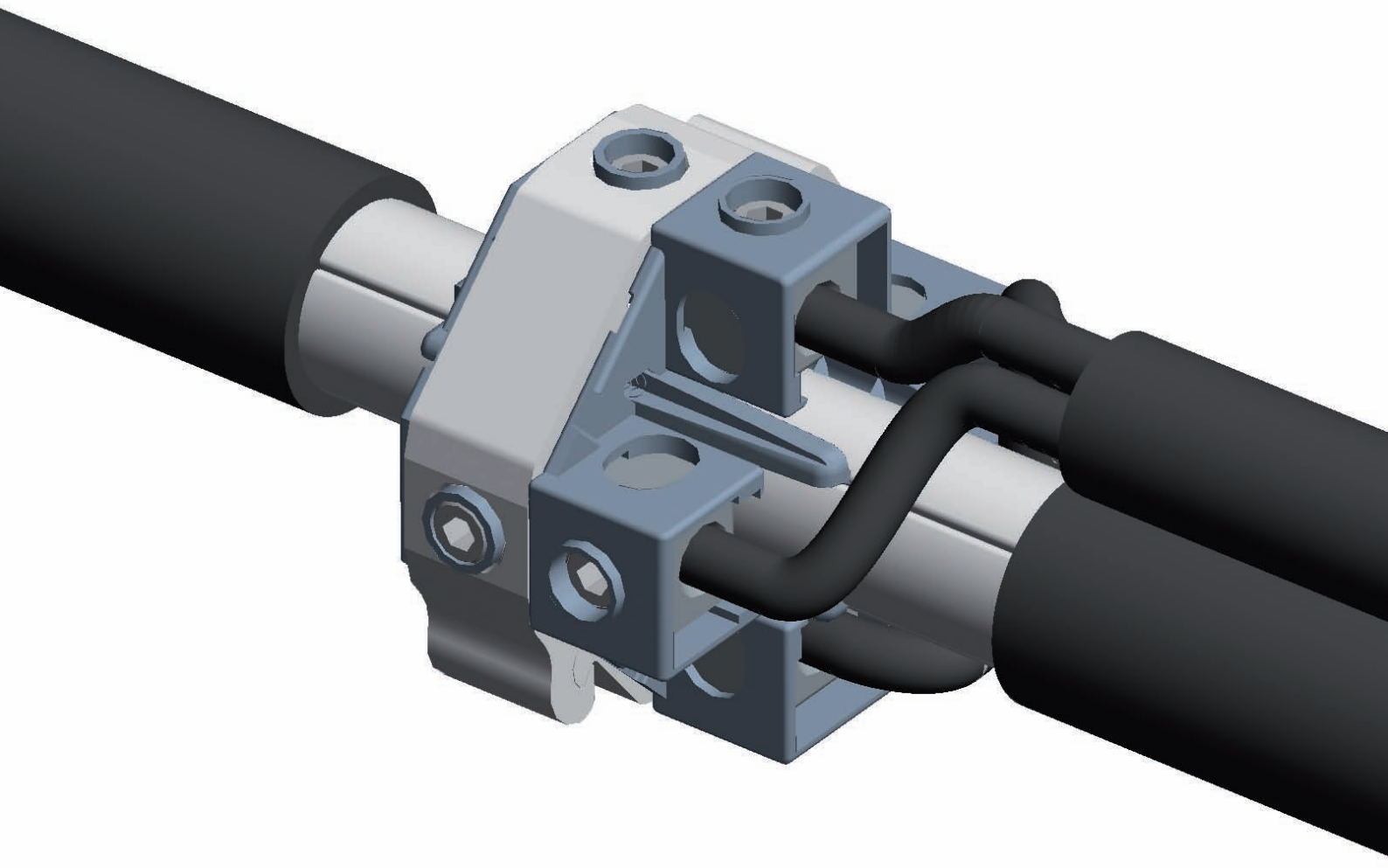
It is daily business to connect a mains cable to a branch cable, especially in low voltage cable networks, for instance for a house service connection.

Many years ago mains cables were stripped at the installation point and the insulation was removed. Branches were made with simple bare branch connectors.

Live installation of course was impossible under such conditions, so the mains cable and all connected consumers were without electric energy until the job was done.

To minimise disturbance of consumers and to increase working safety for the electrician, insulated single connectors were developed, to be installed on insulated conductors. These connectors are provided with insulation-piercing teeth, cutting edges or screws which spare removal of insulation from conductors, and enabled live installation when used with personal protection equipment and insulated tools.

Duration of installation was reduced considerably and at the same time safety of the electrician was increased. Furthermore possible cable damage was reduced (entering of moisture, breaking strands) as the insulation as conductor protection cover remained nearly undamaged.



Why Ring Connectors…

In most cases all phases of the mains cable were to be branched, so consequently the next development step was from a single connector to a multiple one. This multiple branch connector (in short: ring connector) enables branching of a cable on all phases under voltage, in narrowest space. Today this becomes even more important under the aspect of time and cost saving.

Today's multitude of ring connectors relates to manifold cable constructions in low voltage networks. Ring connectors for 3-, 3 ½- and 4-core cables, cables to standards DIN VDE, TGL or other standards, or ring connectors for large or for small cross sections are a consequence of a multitude of cables.

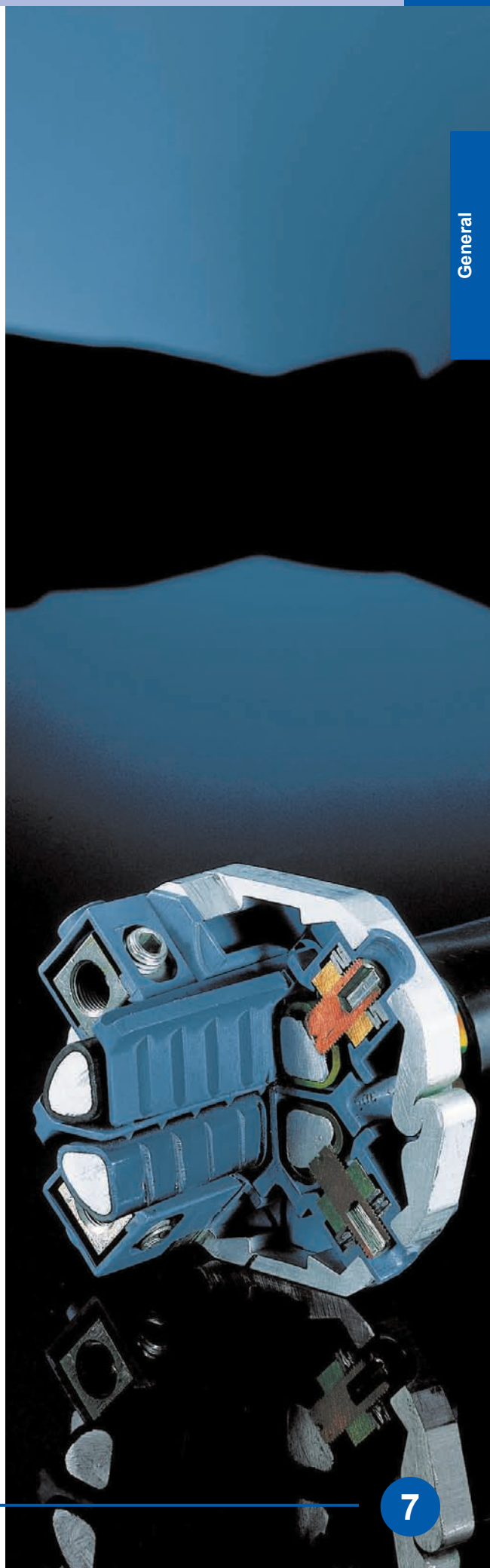
Beside the multitude of cables also different joint systems or working methods play a role.

Ring connectors with grub screw or shear-head screw, ring connectors with axial or radial branch, and ring connectors with increased insulating properties are the result.

In case you will have difficulties to find certain products or if you are uncertain about the selection criteria, please contact us. Contact details can be found on the backside of this catalogue.

We are not only able to offer a versatile ring connector programme, we are also pleased to offer our expertise to support you in selecting suitable products.

This service is a matter of course for us!



Advantages of ARCUS Ring Connectors in general:

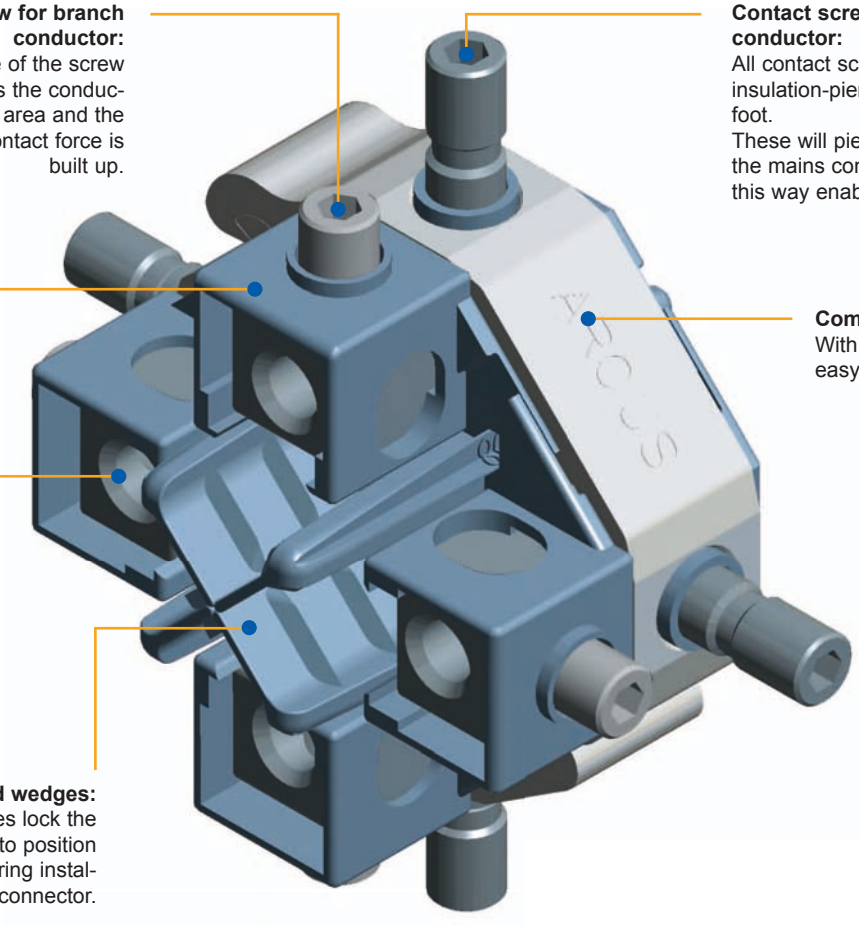
- Safe and permanent cable connections – electrically and mechanically – by use of disc springs.
- Safe live working.
- Large cross-sectional ranges for mains and branch conductors – advantageous storage by universal usage.
- Suitable for all cable forms (3-core, 3 ½-core, 4-core).
- Suitable for all conductor forms (round, sectorial, solid, stranded).
- Suitable for all conductor materials (aluminium, copper).
- All-phase branching possible in narrowest space – important for selection of smallest possible joint.
- Defined contact sequence, e.g. neutral conductor first.

Further advantages of ARCUS Ring Connectors in detail:

All contact screws have standardised key sizes according to DIN 475.
Simple installation with standard tools according to EN 60900.

Contact screw for branch conductor:
The shape of the screw foot compacts the conductor on a large area and the optimum contact force is built up.

Contact screw for mains conductor:
All contact screws are equipped with insulation-piercing slots at the screw foot.
These will pierce the insulation of the mains conductor reliably and this way enable live working.



Insulating housing of contact segment:
Insulation of single phases against each other and against earth.

Compact housing:
With hinge and snap lock for easy installation.

Contact segment for branch conductor:
The finely serrated clamping channel pierces thin layers of foreign matter (oxidation) on branch conductor.

Insulated wedges:
The insulated wedges lock the mains conductors into position safely and reliably during installation of ring connector.

Information on this product catalogue:

We have summarised the most important information on our ring connectors in tables on the product pages.

Due to limited space and necessity to focus on the main features, we have used terms and abbreviations that may not be clear at first sight.

For this reason we explain terms and abbreviations on the following pages.

Cross section [mm²]		Ring Connector				Contact Screw							Wedges	Type Number
Mains	Branch	Dimensions [mm]				Mains		Branch					Type	
		maximum outer diameter	width	length of branch drilling	diameter of branch drilling	insulation piercing screw	insulation-piercing screw with shear head	socket screw	arrangement R	arrangement T	KS(i) DIN 475	torque [Nm]		
Cu 25-50 Al 35-50	6-70 SM 95 SE	91	49.5	20	11.4	•		•		•	5	15	C	398 067
		4	5	6	7	8		9	10		11	12	13	

Information about the Conductors

1 Conductor materials

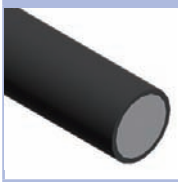
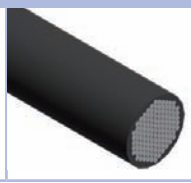
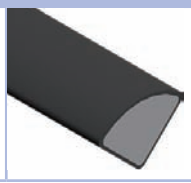
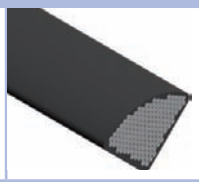
ARCUS Ring Connectors are suitable for conductors made of aluminium and copper.
Aluminium: Al
Copper: Cu

2 Cross sections

ARCUS Ring Connectors are suitable for cross sections according to DIN EN 60228 in the range of 6 - 240 mm².

3 Conductor forms

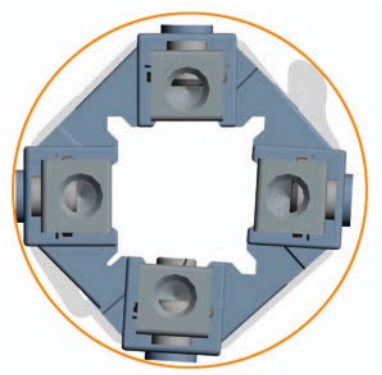
ARCUS Ring Connectors are suitable for the following conductor forms:

RE round, solid	RM round, stranded	SE sectorial, solid	SM sectorial, stranded
			

Information on construction of ring connector

④ The circumscribed circle

The circumscribed circle corresponds to the diameter of a circle which completely circumscribes the ring connector in installed condition. This dimension is relevant for selection of a suitable joint.

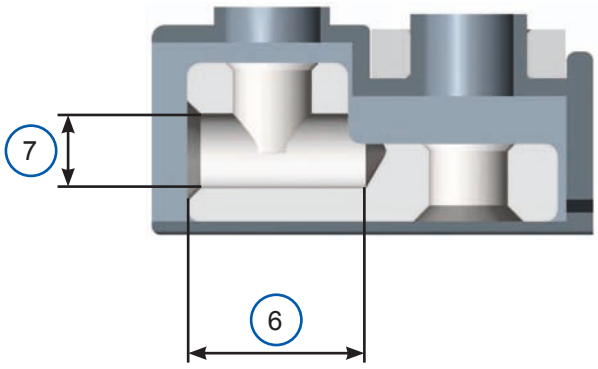


⑤ The ring connector width

The ring connector width corresponds to the dimension of the ring connector expansion in direction of the mains cable. This dimension is relevant for selection of a suitable joint.

⑥ Insertion depth of branch conductor into clamping channel

The insertion depth corresponds to the minimum length to which the branch conductor needs to be stripped for installation.



⑦ The diameter of clamping channel

The diameter of clamping channel describes the maximum radius of the bare branch conductor.

Information on contact screws

The main task of a contact screw is to produce a contact force with the aim to create as many real contact areas as possible between conductor and its contact part. An additional task is to keep both contact parts connected against appearing mechanical forces, in order to maintain the contact areas for a long duration.

In the following we describe some of the criteria of our contact screws which guarantee safe and permanent contacting. Detailed information can be found in our Technical Information "Contact Screws".

⑧ Contact screws for mains conductor

For contacting of insulated mains conductors contact screws are required which on one hand will pierce the conductor insulation, and on the other hand will build up the necessary contact force. Piercing of mains conductor insulation is secured by the design of the screw foot. Thereby the foot of the contact screw is designed in a way that the conductor insulation is pierced whilst the bare conductor remains undamaged.

The required contact force can be obtained in two ways:

- By contact screws with shear head:
  Here the defined tightening torque of the contact screw is secured by shearing off the screw head during installation.
- By contact screws without shear head:
  Here the defined tightening torque of the contact screw is secured by use of a torque wrench or other suitable tool.

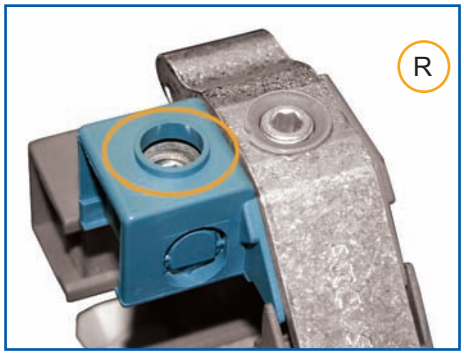
9 Contact screws for branch conductor

For contacting of bare branch conductors preferably grub screws are used. The correct torque is obtained by use of a torque wrench or other suitable tool.

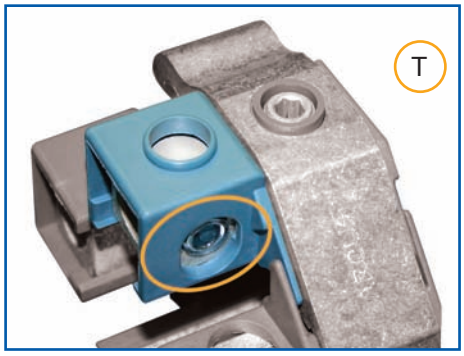
10 The position of the contact screws of the branch conductor - arrangement R and T

“R” stands for radial arrangement of the branch conductor contact screw in relation to the mains conductor.

“T” stands for tangential arrangement of the branch conductor contact screw in relation to the mains conductor.



Pict. shows radial arrangement



Pict. shows tangential arrangement

11 Key size (KS) of contact screws

All contact screws are provided with key sizes according to DIN 475 and can be installed with standard tools.

12 Tightening torques of contact screws

The main task of a contact screw is to produce a contact force in order to guarantee a permanent electrically and mechanically stable cable connection. The tightening torques of contact screws given in the tables secure operational reliability of cable connections.

Information on insulated wedges

Aim is the safe and stable connection of mains and branch conductors. Thereby insulated wedges have a number of tasks during connecting.

Tasks of insulated wedges:

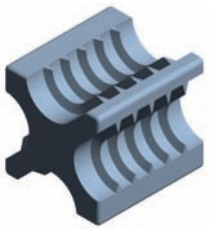
- Positioning of ring connector on the cable,
- Fixing of (yet unconnected) single conductors,
- Insulation of phases towards each other and towards earth (PE / PEN),
- Building a counter force to the contact force (each force requires a counter force).

13 The wedge shapes

The wedge shapes and their allocation to ring connectors are based on the following criteria:

- Cable form (3-core, 3 ½-core, 4-core),
- conductor cross section and dimension of conductor,
- conductor insulation (thickness, hardness or tenacity).

In the following examples of different wedge shapes for 4-core ring connectors are shown.

			
4-part	2-part	2-part	1-part
Type A	Type B	Type C	Type D

Ring Connector (basic model)

309 013

398 110

Wedge type

Type A

Type E

Cross Section [mm²]		Ring Connector				Contact Screw							Wedges	Type Number
Mains	Branch	Dimensions [mm]				Mains		Branch					Type	
		maximum outer diameter	width	length of branch drilling	diameter of branch drilling	insulation-piercing screw	insulation-piercing screw with shear head	socket screw	arrangement R	arrangement T	KS(i) DIN 475	torque [Nm]		
35-50 RM	6-70 SM(r) 95 SE(r)	90	45.5	20	11.4	•		•		•	5	15	E	398 110
70-95 RM 120 SE	6-70 SM(r) 95 SE(r)	90	45.5	20	11.4	•		•		•	5	20	E	398 052
70-150 SE 150 SM	6-70 SM(r) 95 SE(r)	90	45.5	20	11.4	•		•		•	5	20	A	309 013
95-150 SM 185 SE	6-95 SM 120 SE	90	61	19	14.9	•		•		•	5	20	A	309 034

Explanation cross sections: R=round, S=sectorial, E=solid, M=stranded, (r)=rounded

Ring Connector
with Mains Cable Shear Head Bolts

398 127

Wedge type

Type A

Cross Section [mm²]		Ring Connector				Contact Screw							Wedges	Type Number
Mains	Branch	Dimensions [mm]				Mains		Branch					Type	
		maximum outer diameter	width	length of branch drilling	diameter of branch drilling	insulation-piercing screw	insulation-piercing screw with shear head	socket screw	arrangement R	arrangement T	KS(i) DIN 475	torque [Nm]		
70-150 SE 150 SM	6-70 SM(r) 95 SE(r)	90	45.5	20	11.4		•	•		•	5	20	A	398 127

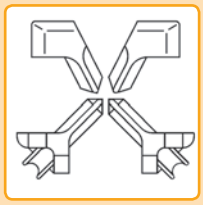
Explanation cross sections: S=sectorial, E=solid, M=stranded, (r)=rounded

Ring Connector (basic model), Ring Connector with Mains Cable Shear Head Bolts

398 115

398 136

Wedge type



Type F

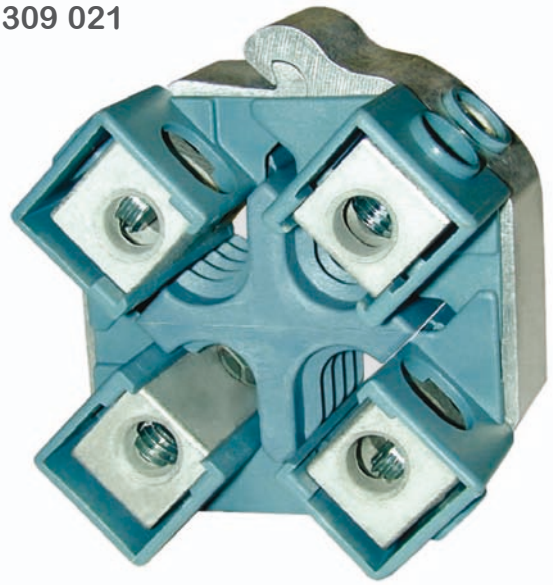
Cross Section [mm²]		Ring Connector				Contact Screw							Wedges	Type Number
Mains	Branch	Dimensions [mm]				Mains		Branch			KS(i) DIN 475	torque [Nm]	Type	
		maximum outer diameters	width	length of branch drilling	diameter of branch drillingr	insulation-piercing screw	insulation-piercing screw withshear head	socket screw	arrangement R	arrangement T				
3x 70 / 1x 35 3x 95 / 1x 50	6-50 SE	93	49.5	20	9.2	•		•	•		5	20	F	398 118
3x 70 / 1x 35 3x 95 / 1x 50	6-70 SM(r) 95 SE(r)	93	49.5	20	11.4		•	•		•	5	20	F	398 136
3x 70 / 1x 35 3x 95 / 1x 50 3x 120 / 1x 70	6-95	104	50	23	14.5	•		•		•	5	20	F	398 115

Explanation cross sections: R=round, S=sectorial, E=solid, M=stranded, (r)=rounded

Ring Connector (basic model)

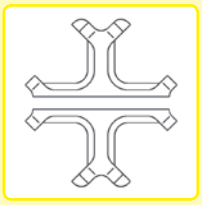
309 029

309 021

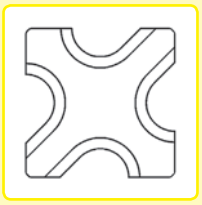


Wedge type

Type B



Type C



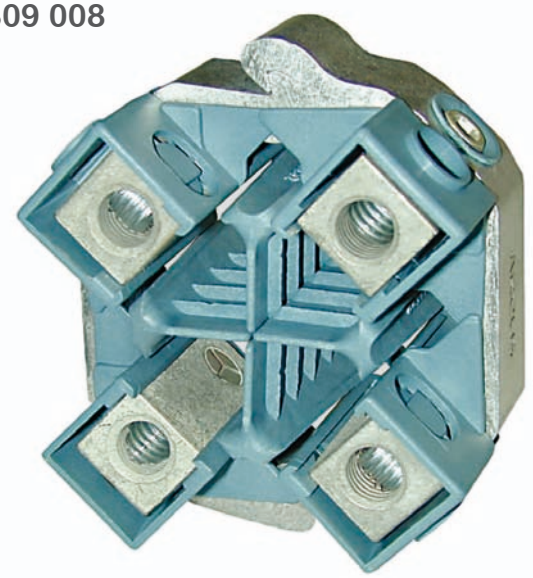
Type D

Cross Section [mm²]		Ring Connector				Contact Screw							Wedges	Type Number
Mains	Branch	Dimensions [mm]				Mains		Branch					Type	
		maximum outer diameter	width	length of branch drilling	diameter of branch drilling	insulation-piercing screw	insulation-piercing screw with shear head	socket screw	arrangement R	arrangement T	KS(i) DIN 475	torque [Nm]		
16-35 RM 35 SM 50 SE	6-35 SM 50 SE	91	49.5	20	9	•		•	•		5	15	D	309 021
Cu 25-50 Al 35-50	6-35 SM 50 SE	91	49.5	20	9.9	•		•	•		5	15	C	309 029
Cu 25-50 Al 35-50	6-70 SM(r) 95 SE(r)	91	49.5	20	11.4	•		•		•	5	15	C	398 067
Cu 25-50 Al 35-70 SE	6-35 SM 50 SE	91	49.5	20	9.9	•		•	•		5	15	B	309 038

Explanation cross sections: R=round, S=sectorial, E=solid, M=stranded, (r)=rounded

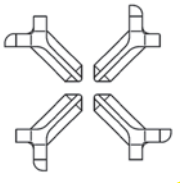
Ring Connector (basic model)

309 008



398 155

Wedge type



Type A

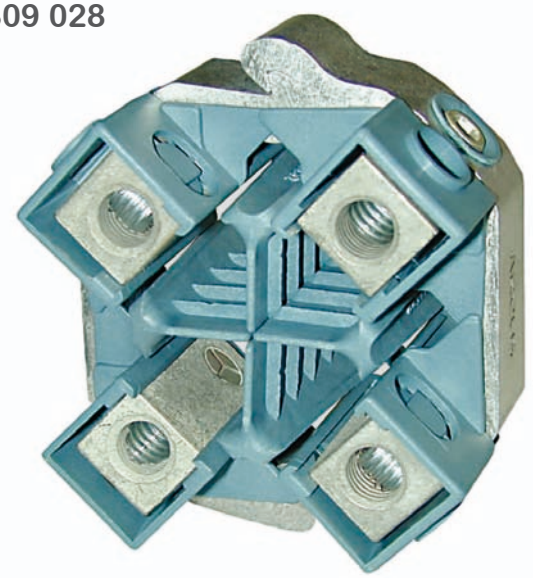
Type B

Cross Section [mm²]		Ring Connector				Contact Screw							Wedges	Type Number
Mains	Branch	Dimensions [mm]				Mains		Branch					Type	
		maximum outer diameter	width	length of branch drilling	diameter of branch drilling	insulation-piercing screw	insulation-piercing screw with shear head	socket screw	arrangement R	arrangement T	KS(i) DIN 475	torque [Nm]		
Cu 25-50 SM Al 35-70 SE	6-70 SM(r) 95 SE(r)	91	49.5	20	11.4	•		•		•	5	15	B	398 155
25-70 SM 95 SE	6-35 SM 50 SE	91	49.5	20	9	•		•	•		5	20	A	398 026
50-70 SM 95 SE	6-35 SM 50 SE	91	49.5	20	9.9	•		•	•		5	15	A	309 008
70-95 SM 120 SE	6-35 SM(r) 50 SE(r)	93	49.5	20	9	•		•	•		5	20	A	309 006

Explanation cross sections: R=round, S=sectorial, E=solid, M=stranded, (r)=rounded

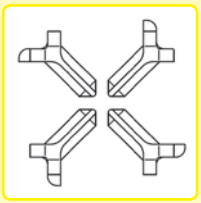
Ring Connector (basic model)

309 028



398 095

Wedge type



Type A

Cross Section [mm²]		Ring Connector				Contact Screw							Wedges	Type Number
Mains	Branch	Dimensions [mm]				Mains		Branch					Type	
		maximum outer diameter	width	length of branch drilling	diameter of branch drilling	insulation-piercing screw	insulation-piercing screw with shear head	socket screw	arrangement R	arrangement T	KS(i) DIN 475	torque [Nm]		
70-95 SM 120 SE	6-70 SM(r) 95 SE(r)	93	49.5	20	11.4	•		•		•	5	20	A	309 016
70-120 SM 150 SE	6-35 SM 50 RE / SE	94	49.5	20	9.7	•		•		•	5	20	A	309 028
70-150 SE 150 SM	6-70 SM(r) 95 SE(r)	110	50	20	11.4	•		•		•	5	20	A	309 019
70-185 SE 150 SM	6-70 SM(r) 95 SE(r)	110	52	20	11.4	•		•		•	5	20	A	398 094
70-185 SE 150 SM	6-70 SM 95 SE	110	66	31	14.2	•		•		•	5	20	A	398 095

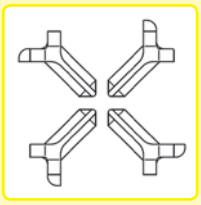
Explanation cross sections: R=round, S=sectorial, E=solid, M=stranded, (r)=rounded

Ring Connector (basic model)

309 025

309 024

Wedge type



Type A

Cross Section [mm²]		Ring Connector				Contact Screw							Wedges	Type Number
Mains	Branch	Dimensions [mm]				Mains		Branch					Type	
		maximum outer diameter	width	length of branch drilling	diameter of branch drilling	insulation-piercing screw	insulation-piercing screw with shear head	socket screw	arrangement R	arrangement T	KS(i) DIN 475	torque [Nm]		
70-150 SM 185 SE	6-95 SM(r) 120 SE(r)	110	66	31	14.2	•		•		•	5	20	A	309 025
95-150 SM 185 SE	16-120 RM / SM 150 SE	120	93	55	17.9	•		•		•	5	20	A	309 024
95-150 SM 185 SE	6-70 SM(r) 95 SE(r)	114	50	20	11.4	•		•		•	5	20	A	309 020

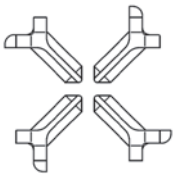
Explanation cross sections: R=round, S=sectorial, E=solid, M=stranded, (r)=rounded

Ring Connector
with Mains Cable Shear Head Bolts

398 116

309 043

Wedge type



Type A

Type B

Cross Section [mm²]		Ring Connector				Contact Screw							Wedges	Type Number
Mains	Branch	Dimensions [mm]				Mains		Branch			KS(i) DIN 475	torque [Nm]	Type	
		maximum outer diameter	width	length of branch drilling	diameter of branch drilling	insulation-piercing screw	insulation-piercing screw with shear head	socket screw	arrangement R	arrangement T				
25-35 RM 50 SM 70 SE	6-35 SM 50 SE	91	49.5	20	9.9		•	•	•		5	15	B	309 043
70-150 SE 150 SM	6-70 SM(r) 95 SE(r)	110	50	20	11.4		•	•		•	5	20	A	398 116
70-150 SM 185 SE	6-35 SM 50 SE	106	52	20	11.4		•	•		•	5	20	A	398 125

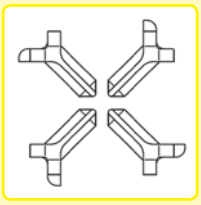
Explanation cross sections: R=round, S=sectorial, E=solid, M=stranded, (r)=rounded

Ring Connector
with Mains Cable Shear Head Bolts

398 137

398 162

Wedge type



Type A

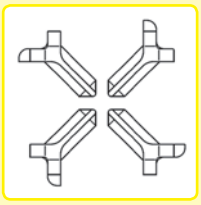
Cross Section [mm²]		Ring Connector				Contact Screw							Wedges	Type Number
Mains	Branch	Dimensions [mm]				Mains		Branch					Type	
		maximum outer diameter	width	length of branch drilling	diameter of branch drilling	insulation-piercing screw	insulation-piercing screw with shear head	socket screw	arrangement R	arrangement T	KS(i) DIN 475	torque [Nm]		
70-150 SE 150 SM	6-95 SM(r) 120 SE(r)	110	66	31	14.2		•	•		•	5	20	A	398 134
70-150 SM 185 SE	6-70 SM 95 SE	110	66	31	14.2		•	•		•	5	20	A	398 137
95-150 SM 185 SE	16-120 RM / SM 150 SE	120	93	55	17.9		•	•		•	5	25	A	398 162

Explanation cross sections: R=round, S=sectorial, E=solid, M=stranded, (r)=rounded

Ring Connector
with Insulated Shear Head Bolts for Mains Cable

309 042

Wedge type



Type A

Cross Section [mm²]		Ring Connector				Contact Screw							Wedges	Type Number
Mains	Branch	Dimensions [mm]				Mains		Branch					Type	
		maximum outer diameter	width	length of branch drilling	diameter of branch drilling	insulation-piercing screw	insulation-piercing screw with shear head	socket screw	arrangement R	arrangement T	KS(i) DIN 475	torque [Nm]		
50-95 SM 150 SE	6-25	91	49.5	20	9.2		•	•	•		5 / 13	14	A	309 042

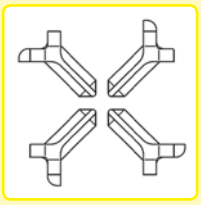
Explanation cross sections: R=round, S=sectorial, E=solid, M=stranded, (r)=rounded

This ring connector is provided with mains insulation-piercing screws with shear-head made of synthetic material. The screw head is potential-free and offers an optimum protection against accidental contact.

Ring Connector for Cable to TGL Standard and other Uncompacted Aluminium Cables

309 037

Wedge type



Type A

Cross Section [mm²]		Ring Connector				Contact Screw							Wedges	Type Number
Mains	Branch	Dimensions [mm]				Mains		Branch					Type	
		maximum outer diameter	width	length of branch drilling	diameter of branch drilling	insulation-piercing screw	insulation-piercing screw with shear head	socket screw	arrangement R	arrangement T	KS(i) DIN 475	torque [Nm]		
120 SM-240 SM[1)] 150 SE-240 SE	6-70 95 SE	114	65	25.5	13.5		•	•		•	5 / 6	20	A	309 037

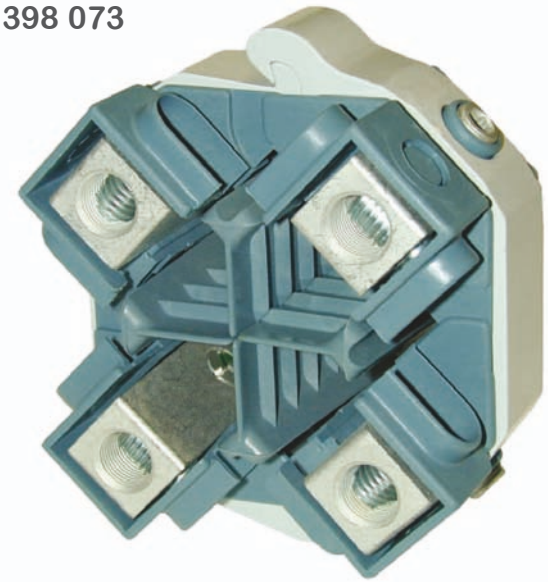
Explanation cross sections: S=sectorial, E=solid, M=stranded
1) 240 SM only after consultation with ARCUS Schiffmann

This ring connector was designed especially for cables to TGL Standard. Here the mains screws are provided with two shear-off positions to meet the demands of the special TGL cable construction, an uncompacted cable conductor.

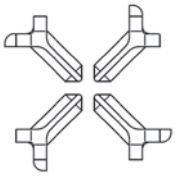
After piercing the conductor insulation, this shear-head screw only operates as pure pressure screw, and prevents cutting of single conductor strands.

Ring Connector
with Coated Aluminium Housing

398 073



Wedge type



Type A

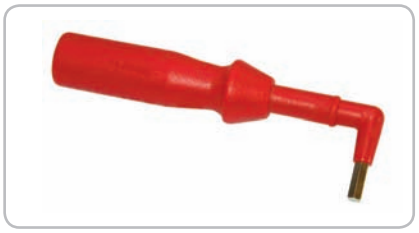
Cross Section [mm²]		Ring Connector				Contact Screw							Wedges	Type Number
Mains	Branch	Dimensions [mm]				Mains		Branch					Type	
		maximum outer diameter	width	length of branch drilling	diameter of branch drilling	insulation-piercing screw	insulation-piercing screw with shear head	socket screw	arrangement R	arrangement T	KS(i) DIN 475	torque [Nm]		
50-70 SM 95 SE	6-35 SM 50 SE	91	50	20	9.9	•		•	•		5	20	A	398 074
70-150 SE 150 SM	6-70 SM(r) 95 SE(r)	110	50	20	11.4	•		•		•	5	20	A	398 073

Explanation cross sections: S=sectorial, E=solid, M=stranded, (r)=rounded

This ring connector was designed for installation in mountainous areas with great altitude differences (inclines).
In such cable systems water that has entered the cable would cause considerable hydrostatic pressure in service joints. Above type is able to withstand this extreme strain because of the additional insulating special coating of the aluminium housing.

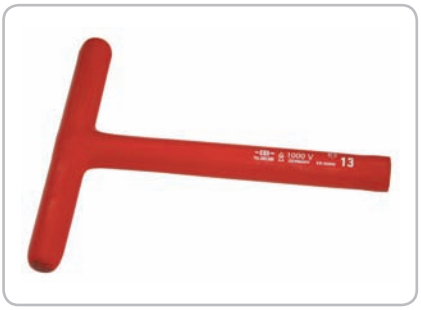
Tools for live installation up to 1000 V AC and 1500 V DC

T-Box wrench Hexagon socket	Type Number
KS 4	620 155
KS 5	620 156
KS 6	620 157



Angular wrench Hexagon socket	Type Number
KS 5	620 159
KS 6	620 160

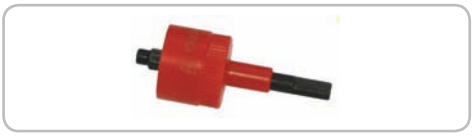
Spreading wedge Length	Type Number
120 mm	109 177
198 mm	198 184



T-Box wrench Hexagon head, Length	Type Number
KS 13, 200 mm long	620 034

Torque wrench	Type Number
Torque wrench 20 Nm without inserts	620 147

- Suitable for live installation up to 1000 V AC / 1500 V DC.
- Synthetic insulation according to VDE 0682 part 201.
- High release precision with a tolerance of ± 1 Nm.
- Quick-change inserts.
- Release signal clearly audible and perceivable when adjusted torque is reached.
- Calibration certificate included.



Inserts for torque wrench	Type Number
KS 5	620 148
KS 6	620 149

Case made of synthetic material, empty	Type Number
For storage of torque wrench 620 147 and 2 inserts.	615 040

Catalogues from Product Range “Cable Connection Technique“

Screw Connectors
and Screw Cable Lugs

Ring Connectors

Single Connectors

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